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MICROWAVE SPECTROSCOPY OF MOLECULES

BIBLIOGRAPHY 1964 - 1966

by Gordon E. Jones, B. Wayne Castleman, and Rudolph G. Oswald

Prepared by

MISSISSIPPI STATE UNIVERSITY

State College, Miss.

for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION • WASHINGTON, D. C. • NOVEMBER 1967



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BIBLIOGRAPHY

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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This bibliography is a result of a study sponsored by the National Aeronautics and Space Administration (NASA Grant NGR 25-001-008). The primary purpose of the study is the adaptation of microwave spectroscopy to the problem of detecting and identifying contaminants in the atmosphere of closed space capsules. Advantages inherent in microwave techniques make microwave spectroscopy perhaps the most promising single approach to this problem. Since the close of the second world war, spectroscopists have made good use of the characteristic high resolution and enormous accuracy of microwave spectroscopy in the study of molecular structure. Whereas its possibilities for chemical analysis have been acknowledged, however, little has been done toward the development of microwave spectroscopy for this purpose.

A first step in the development of this technique for chemical analysis is the compilation of microwave spectra of the gases that are likely to be of interest. Even if analyses are limited to the atmosphere of space capsules, a large number of molecules is involved. A complete bibliography of microwave measurements of gases can obviously be of great assistance in an effort to assimilate the data necessary for chemical analysis. Various other bibliographies have been compiled that include measurements made through 1964. This work seems to be the first to include the period 1964 - 1966.

An effort was made to be complete; however, completeness is by no means guaranteed. Some omissions are sure to exist. There seems to be as yet no standard format for bibliographies of this type. The one was chosen that seemed the most efficient.

The bibliogrpahy is divided into two parts: inorganic molecules and organic molecules.

Key To Symbols Used in Bibliography

μ	Electric dipole moment
S	Structure (bond distances, angles)
A, B, C	Rotation constants
H, D, C ^{12,13} O ^{16,18} , etc.	Isotopes
ω	Vibrational frequency
eQq	Quadrupole coupling constant
v	Barrier to internal rotation
χ, η	Quadrupole coupling parameters
ν	Frequency
Int.	Intensity
I	Moment of Inertia
α	Vibration-rotation interaction constant
λ, γ, c_1	Magnetic coupling constants
D _j , D _{jk}	Centrifugal distortion constants
c	Spin-rotation interaction constant

INORGANIC MOLECULES

Aluminum chloride (AlCl)

D. R. Lide, J. Chem. Phys. 42, 1013 (1965)
Be, S, eQq, μ , Al35,37

Aluminum fluoride (AlF)

D. R. Lide, J. Chem. Phys. 42, 1013 (1965)
Be, eQq, μ , Al35,37, S

Ammonia (NH_3)

A. Ben-Reuven, Phys. Rev. Letters 14, 349 (1965)
Transition from resonant to nonresonant line shape

P. Cahill, L. C. Krisher, and P. Thaddeus, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper N-9 (1964)
H, D, Inversion, eQq

H. A. Dijkerman, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 321 (1965)
 ν

S. G. Kukolich, Phys. Rev. 138, 1322 (1965)
Hyperfine structure of inversion line

M. Lichtenstein, J. J. Gallagher, and V. E. Derr, J. Mol Spectroscopy 12, 87 (1964)
 ν , inversion, H, D

C. C. Lin and E. A. Rinehart, Bull. Am. Phys. Soc. Ser. II 9, 101 (1964)
Inversion, ν

V. N. Morozov, A. N. Oraevskii, G. M. Strakhovskii, and V. M. Tatarenkov, Optika i Spektroskopiya 18, 785 (1965)
Hyperfine structure of $^{15}\text{NH}_3$ inversion spectrum

R. W. Parson and J. A. Roberts, J. Mol. Spectroscopy 18, 412 (1965)
 ν

E. A. Rinehart, R. L. Legan, and C. C. Lin, Bull. Am. Phys. Soc. Ser. II 9, 101 (1964)
Inversion, ν

J. A. Roberts, R. L. Legan, E. A. Rinehart, and C. C. Lin, J. Chem. Phys. 43, 4337 (1965)

E. Schnabel, T. Toerring, and H. Wilke, Z. Physik 188, 167 (1965)
 $\text{N}^{14,15}$, Inversion, Int.

P. Sircar and J. Hardin, Compt. Rend. 259, 1500 (1964)
Inversion, eQq, maser techniques

Ammonia (NH_3)

P. Thaddeus, L. C. Krisher, and P. Cahill, J. Chem. Phys. 41, 1542 (1964)
D, eQq, S, ν

Arsenic tri-fluoride (AsF_3)

A. M. Mirri and D. Diamani, Atti. Accad. nazl. Lincei., Rend. Classe. Sci. Fis., Mat. Nat. 40, 635 (1966)
 ν , Dj

Cesium chloride (CsCl)

P. L. Clouser and W. Gordy, Phys. Rev. 134, 863 (1964)
B, α , D, ω , μ , S, etc.

Cesium fluoride (CsF)

S. E. Veazey and W. Gordy, Phys. Rev. 138, 1303 (1965)
S, I, α , B_0 , $\text{Rb}^{85,87}$

Cesium hydroxide (CsOH)

R. L. Kuczkowski, D. R. Lide, and L. C. Krisher, J. Chem. Phys. 44, 3131
(1966)
S

Chlorine iodine (ClI)

H. W. deWijn, Physica 31, 1215 (1965)
 ν

Chlorine oxide (Cl_2O)

G. E. Herbenich, R. H. Jackson, and D. J. Miller, J. Chem. Soc., A., Inorg.,
Phys., Theoret. 1966(3), 336
A, B, C, Dj, S, Cl35,37

Dinitrogen difluoride (N_2F_2)

Y. Y. Kuzyakov and E. N. Moskvitina, Vest. Mosk. Univ. Ser. II, Khim 20,
15 (1965)
Isomeric form

Dinitrogen trioxide (N_2O_3)

R. L. Kuczkowski, J. Am. Chem. Soc. 87, 5259 (1965)
S, A, B, C, I

Dysprosium (Dy)

D. M. S. Baggaley and J. Liesegang, Phys. Rev. Letters 17, 96 (1965)
Microwave absorption in rare earth metals

Erbium (Er)

D. M. S. Baggaley and J. Liesegang, Phys. Rev. Letters 17, 96 (1965)
Microwave absorption in rare earth metals

Gadolinium chloride (GdCl_3)

E. Becker, N. Bonrath, K. H. Hellwege, B. Unger, F. Kuech, and M. Schinkmann,
Phys. Rev. Letters 19, 86 (1965)
Microwave absorption and magnetic transition

Germanium mono-sulfide (GeS)

J. Hoeft, Z. Naturforsch 20, 826 (1965)
eQq, S, B, v

Germanium monoxide (GeO)

T. Toerring, Z. Naturforsch 21, 287 (1966)
Be, ce, S, eQq

Germanyl bromide (GeH_3Br)

K. H. Rhee and M. K. Wilson, J. Chem. Phys. 43, 333 (1965)
S, A, B, C

Germanyl chloride (GeH_3Cl)

K. H. Rhee and M. K. Wilson, J. Chem. Phys. 43, 333 (1965)
S, A, B, C

Germanyl fluoride (GeH_3F)

K. H. Rhee and M. K. Wilson, J. Chem. Phys. 43, 333 (1965)
S, A, B, C

Germanyl iodide (GeH_3I)

K. H. Rhee and M. K. Wilson, J. Chem. Phys. 43, 333 (1965)
S, A, B, C

H radical (H)

A. H. Barrett, M. L. Meeks, and S. Weinreb, Nature 202, 475 (1964)
Absorption lines of Cassiopeia A

Hydrazine (N_2H_4)

T. Kasuya and T. Kojima, Proc. Intl. Symp. Mol. Struct. and Spectroscopy,
Tokyo, C404, 4 (1962)

Hydrazoic acid (HN_3)

K. White and R. L. Cook, Bull. Am. Phys. Soc. Ser. II 10, 491 (1965)
 μ

R. Kewley, K.V.L.N. Sastry, and M. Winnewisser, J. Mol. Spectroscopy 12,
387 (1964)

A, B, C, D_j, D_{jk}, eQq

M. Winnewasser and R. L. Cook, J. Chem. Phys. 41, 999 (1964)
A, B, C, S, isotopes

Hydrocyanic acid (HCN)

A. Maki and D. R. Lide, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper H-6
(1965)
H, D, ν

H. W. de Wijn, Physica 31, 1215 (1965)
 ν

Hydrogen bromide (HBr)

G. Jones and W. Gordy, Phys. Rev. 136, 1229 (1964)
eQq, B, S, ν

G. Jones, Univ. Microfilms (Ann Arbor, Mich.), Order No. 64-11, 680, 83 pp.,
Diss. Abstract 26(2), 1097 (1965)
Submillimeter wave spectra HBr, HCl, CO

Hydrogen chloride (HCl)

Krishnaji, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 348 (1965)
 ν

Krishnaji and S. L. Srivastava, J. Chem. Phys. 42, 1546 (1965)
 ν

Krishnaji and S. L. Srivastava, J. Chem. Phys. 43, 1345 (1965)
 ν

G. Jones and W. Gordy, Phys. Rev. 136, 1229 (1964)
eQq, B, C₁, S, ν

G. Jones and W. Gordy, Phys. Rev. 135, 295 (1964)
B_O, D_O, H³⁵Cl

G. Jones, Univ. Microfilms (Ann Arbor, Mich.), Order No. 64-11, 680, 83 pp.,
Diss. Abstract. 26(2), 1097 (1965)
Submillimeter wave spectra HBr, HCl, CO

Hydrogen iodide (HI)

G. Jones and W. Gordy, Phys. Rev. 136, 1229 (1964)
B, D_j, eQq

Hydrogen sulfide (H₂S)

C. Huiszoon and A. Dymanus, Physica 31, 1049 (1965)
 μ

P. Thaddeus, L. C. Krisher, and J. H. N. Loubser, J. Chem. Phys. 40, 257 (1964)
eQq, c, H, D

Indium monochloride (InCl)

G. A. L. Delvigne and H. W. deWijn, J. Chem. Phys. 45, 3318 (1966)
eQq, S, α

Lead mono-sulfide (PbS)

J. Hoeft, Z. Naturforsch 19, 1134 (1964)

Lead monoxide (PbO)

T. Toerring, Z. Naturforsch 19, 1426 (1964)
S, μ

Lead sulfide (PbS)

J. Hoeft, Z. Naturforsch 19, 1134 (1964)
Pb^{206,207,208}, S^{32,34}, D_j, S, α

J. Hoeft, J. Appl. Phys. 15, 1134 (1964)
Spectrum

Lithium bromide (LiBr)

F. W. Breivogel, AEC Accession No. 44427, Rept. No. UCRL-11665, Avail. OTS,
8 pp., (1964)
eQq, μ , Br^{79,81}

A. J. Hebert, F. W. Breivogel, and K. Street, J. Chem. Phys. 41, 2368 (1964)
eQq, B, μ , c, Br^{79,81}, molecular beam electric resonance method

Lithium chloride (LiCl)

D. R. Lide, P. Cahill, and L. P. Gold, J. Chem. Phys. 40, 156 (1964)
B, S, α , μ , Cl^{35,37}

Lithium fluoride (LiF)

S. E. Veazey and W. Gordy, Phys. Rev. 138, 1303 (1965)
S, I, α , B_O, Rb^{85,87}

Lithium iodide (LiI)

F. W. Breivogel, AEC Accession No. 44427, Rept. No. UCRL-11665, Avail. OTS,
8 pp. (1964)
eQq, μ , I¹²⁷

F. W. Breivogel, A. J. Hebert, and K. Street, J. Chem. Phys. 42, 1555 (1965)
B, eQq, μ , c, ν , molecular beam electric resonance method

Nitric acid (HNO_3)

A. P. Cox and J. M. Riverds, J. Chem. Phys. 42, 3106 (1965)
 $\text{D}, \text{S}, \mu, \text{O}^{16,18}, \text{N}^{14,15}$

Nitril chloride (NO_2Cl)

Y. Morino and T. Tanaka, J. Mol. Spectroscopy 16, 179 (1965)
 $\text{Cl}^{35}, \text{A}, \text{B}, \text{C}, \text{D}_j, \text{S}, \text{eQq}, \alpha$

Nitrogen dioxide (NO_2)

G. R. Bird, J. C. Baird, A. W. Jache, J. A. Hodgeson, R. F. Curl, A. C. Kunkle, J. W. Bransford, J. Rostrup-Anderson, and J. Rosenthal, J. Chem. Phys. 40, 3378 (1964)
 $\text{A}, \text{B}, \text{C}$, force constants, ν , isotopes

L. Esterowitz and J. Rosenthal, J. Chem. Phys. 40, 1986 (1964)
 $\mu, \text{N}^{14,15}$

P. D. Foster, J. A. Hodgeson, and R. F. Curl, J. Chem. Phys. 45, 3760 (1966)
 eQq

J. A. Hodgeson, Univ. Microfilms (Ann Arbor, Mich.), Order No. 65-10, 337, 91 pp.,
Diss. Abstract 26(5), 2494 (1965)
The microwave spectrum of

J. McGibney, Univ. Microfilms (Ann Arbor, Mich.), Order No. 65-9947, 115 pp.,
Diss. Abstract 26(8), 4740 (1966)
 $\text{O}^{16,18}$

Nitrogen trifluoride (NF_3)

R. L. Armstrong, J. B. Newman, and J. J. Whalen, AD608739, Avail. CFSTI, 33 pp.,
(1964)
 ν

Nitrosyl bromide (NOBr)

A. Guarnieri and P. G. Favero, Nuovo Cimento 39, 76 (1965)
 eQq , isotopes

A. Guarnieri and P. G. Favero, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 149 (1965)
 $\text{B}, \text{C}, \text{eQq}$

A. M. Mirri and E. Mazzariol, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 148 (1965)
 D_j

A. M. Mirri and E. Mazzariol, Spectrochim. Acta 22, 785 (1966)
 $\text{D}_j, \text{D}_{jk}, \text{Br}^{79}$

Nitrosyl chloride (NOCl)

A. Guarnieri and P. G. Favero, Nuovo Cimento 39, 76 (1965)
 eQq , isotopes

A. Guarnieri and P. G. Favero, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 149 (1965)
 $\text{B}, \text{C}, \text{eQq}$

Nitrosyl chloride (NOCl)

A. M. Mirri and E. Mazzariol, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 148 (1965)
D_j

A. M. Mirri and E. Mazzariol, Spectrochim. Acta 22, 785 (1966)
D_j, D_{jk}, Cl35,37

Nitrosyl fluoride (NOF)

R. L. Cook, J. Chem. Phys. 42, 2927 (1965)
A, B, C, band force constants

A. Guarneri, G. Zuliani, and P. G. Favero, Nuovo Cimento 45, 84 (1966)
eQq

Nitrous acid (HNO₂)

Symp. Mol. Struct. and Spectroscopy, Ohio, Paper Y-11 (1965)
H, D, A, B, C, D_j, eQq

Nitrous acid, trans- (HNO₂)

A. P. Cox and R. L. Kuczkowski, J. Am. Chem. Soc. 88, 5071 (1966)
S, μ , eQq

Nitrous oxide (N₂O)

R. Holmes, R. G. Jones, and R. Lawrence, J. Chem. Phys. 41, 2955 (1964)
Rotational relaxation

M. Saucho and M. D. Harmony, J. Chem. Phys. 45, 1812 (1966)
eQq, spin rotation constant

W. J. Lafferty and D. R. Lide, J. Mol. Spectroscopy 14, 407 (1965)
Effects of quadrupole splitting and centrifugal distortion are discussed

Nitryl chloride (NO₂Cl)

Y. Morino and T. Tanaka, J. Mol. Spectroscopy 16, 179 (1965)
A, B, C, eQq

OH radical (OH)

A. H. Barrett, M. L. Meeks, and S. Weinreb, Nature 202, 475 (1964)
Absorption lines of Cassiopeia A

Oxygen (O₂)

A. H. Barret, J. W. Kuiper, and W. B. Lenoir, J. Geophys. Res. 71, 4723
(1966)
Oxygen in the terrestrial atmosphere

Oxygen difluoride (OF₂)

J. W. Nebgen, F. I. Metz, and W. B. Rose, J. Mol. Spectroscopy 21, 99 (1966)
Fermi resonance

Y. Morino and S. Saito, J. Mol. Spectroscopy 19, 435 (1966)
 α , S

Oxygen fluoride (OF₂)

W. H. Flygare, J. Chem. Phys. 42, 1157 (1965)
c, magnetic shielding

Phosphorus, tri-chloride (PCl_3)

A. M. Mirri, F. Scappini, and P. G. Favero, Spectrochim. Acta 21, 965 (1965)
 D_j , D_{jk}

Phosphorus, tri-fluoride (PF_3)

A. M. Mirri and F. Scappini, Spectrochim. Acta 21, 965 (1965)
 D_j , D_{jk}

Potassium chloride (KCl)

P. L. Clouser and W. Gordy, Phys. Rev. 134, 863 (1964)
 B , α , D , ω , μ , S , etc.

J. S. Muirhead, U. S. Atomic Energy Commission, UCRL-11229, 1 (1964)
Sensitivity of high temperature spectrometer determined

Potassium fluoride (KF)

S. E. Veazey and W. Gordy, Phys. Rev. 138, 1303 (1965)
 S , I , α , B_O

Potassium hydroxide (KOH)

R. L. Kuczkowski, D. R. Lide, and L. C. Krisher, J. Chem. Phys. 44, 3131
(1966)
 S

Rubidium chloride (RbCl)

P. L. Clouser and W. Gordy, Phys. Rev. 134, 863 (1964)
 B , α , D , ω , μ , S , etc.

Rubidium fluoride (RbF)

S. E. Veazey and W. Gordy, Phys. Rev. 138, 1303 (1965)
 S , I , α , B_O , $\text{Rb}^{85,87}$

Silicon difluoride (Si_2F_4)

A. P. Cox and R. Varma, J. Chem. Phys. 44, 2619 (1966)
V, A, B, C, S, μ , $\text{S}^{28,29,30}$

V. M. Rao and R. F. Curl, J. Chem. Phys. 45, 2032 (1966)
 D_J

V. M. Rao, P. L. Timms, and R. F. Curl, J. Chem. Phys. 43, 2557 (1965)
A, B, C, S, μ , ν

Silicon selenium (SiSe)

J. Hoeft, Z. Naturforsch. 20, 1122 (1965)
S, ν , $\text{Si}^{28,29,30}$, $\text{Se}^{76,77,78,80,82}$

Silicon sulfide (SiS)

J. Hoeft, Z. Naturforsch. 20, 1327 (1965)
S, ν , $\text{Si}^{28,29,30}$, $\text{S}^{32,34}$

Silver bromide (AgBr)

L. C. Krisher and W. G. Norris, J. Chem. Phys. 44, 974 (1966)
S, eQq, Be, α_e , De, $\text{Br}^{79,81}$

Silver chloride (AgCl)

E. Pearson and W. Gordy, Phys. Rev. 152, 42 (1966)
Be, α, γ , D, ω , S

L. C. Krisher and W. G. Norris, J. Chem. Phys. 44, 391 (1966)
S, μ , eQq, Be, α_e , γ_e , D

Sodium chloride (NaCl)

P. L. Clouser and W. Gordy, Phys. Rev. 134, 863 (1964)
 μ , B, α , D, ω , S, etc.

Sodium fluoride (NaF)

C. D. Hollowell, A. L. Hebert, and K. Street, J. Chem. Phys. 41, 3540 (1964)
μ, eQq, B, c, molecular-beam electric resonance method

S. E. Veazey and W. Gordy, Phys. Rev. 138, 1303 (1965)
S, I, α , B_0

SO radical (SO)

F. X. Powell and D. R. Lide, J. Chem. Phys. 41, 1413 (1964)
B, μ , S, γ

M. Winnewisser, K.V.L.N. Sastry, R. L. Cook, and W. Gordy, J. Chem. Phys. 41,
1687 (1964)
 B_0 , D_0 , γ

Sulfur dioxide (SO_2)

A. Bauer, Diss. Univ. de Lille, Fr. (1964)

Sulfur dioxide (SO_2)

A. Bauer and J. Bellet, J. Phys. (Paris) 25, 805 (1964) Fr.
Rotational spectra studies, S_{32,34}

A. Bauer and J. Bellet, Compt. Rend. v 258, 873 (1964)

A. Bauer, J. Bellet, P. Puzet, and A. Remy, Compt. Rend., Acad. Sci. Paris
259, 761 (1964)
A, B, C, D_j, D_{jk}

J. Bellet, Diss. Univ. de Lille, Fr. (1965)
S_{32,33,34}, A, B, C, D_j

J. Bellet, Ann. Phys. (Paris) 10, 827 (1965) Fr.
A, B, C, D_j, S_{32,33,34}, O_{16,18}

A. Bellet, C. Samson, R. van Riet, Bull. Classe. Sci., Acad. Roy. Belg. 51,
893 (1965) Fr.
A, B, C, D_j, D_{jk}, v

H. A. Gebbie, N. W. Stone, E. K. Gora, S. A. Clough, and F. X. Kneizys, Symp.
Mol. Struct. and Spectroscopy, Ohio, Paper V-5 (1964)
Spectrum

M. de Hemptinne, A. Defossez, F. Bruyninck, G. Steenbeekeliers, and R. van Riet,
Bull. Acad. Roy. Belg. 50, 1367 (1964)
O_{16,17}, Int., A, B, C, D_j, X

K. R. Lindfors and C. D. Cornwell, J. Chem. Phys. 42, 149 (1965)
 μ , rate-of-growth technique for the measurement of molecular dipole moments
from microwave spectra at weak modulation fields

R. van Riet, Ann. Soc. Sci. Bruxelles 78, 90 (1964)
Spectrum

R. van Riet, Ann. Soc. Sci. Bruxelles 78, 97 (1964)
Spectrum

R. van Riet, Ann. Soc. Sci. Bruxelles 78, 113 (1964)
A, B, C, S, S₃₆

R. van Riet, Ann. Soc. Sci. Bruxelles 78, 237 (1964)
A, B, C, D_j, O_{16,18}

Y. Morino, Y. Kikuchi, S. Saito, and E. Hirota, J. Mol. Spectroscopy 13, 95
(1964)
S, force constants

Sulfur monofluoride (S_2F_2)

R. D. Brown, F. R. Burden, and G. P. Pez, Chem. Commun. 13, 277 (1965)
Isomers of S_2F_2

Sulfur monofluoride (S_2F_2)

R. L. Kuczowski, Diss. Harvard Univ., Diss. Abstract 25, 64-11, 561 (1964)
 $S^{32,34}$, A, B, C, S, μ

R. L. Kuczowski, J. Am. Chem. Soc. 86, 3617 (1964)
S, μ

Sulfur monoxide (SO)

M. Winnewisser, K.V.L.N. Sastry, R. L. Cook, and W. Gordy, J. Chem. Phys. 41,
1687 (1964)
B, χ

Sulfuryl chloride (SO_2Cl_2)

C. Abbar, Compt. Rend. 261, 365 (1965)
eQq, A-C, χ

C. Abbar, G. Journel, and A. Moise, Compt. Rend. 261, 5047 (1965)
Cl35

Sulfuryl fluoride (SO_2F_2)

D. R. Lide, D. E. Mann, and J. J. Comeford, Spectrochim. Acta 21, 497 (1965)
vibrational assignment of sulfuryl fluoride

Terbium (Tb)

D. M. S. Baggaley and J. Liesegang, Phys. Rev. Letters 17, 96 (1965)
Microwave absorption in rare earth metals

Thallium chloride (TlCl)

H. W. deWijn, Physica 31, 1193 (1965)
eQq, B_e, S, ω , Tl^{205,203}, Cl^{34,35}

H. W. deWijn, Physica 31, 1215 (1965)
 ν

H. W. deWijn, Physica 31, 1557 (1965)
Two quantum transitions in microwave rotation spectra

Thionitrosyl fluoride (NSF)

A. M. Mirri and A. Guarnieri, Atti. Accad. Nazl. Lincei., Rend., Classe.
Sci. Fis., Mat. Nat. 40, 641 (1966)

Thionylimine (HNSO)

W.H. Kirchoff, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper N-8 (1964)
S, μ

Tin selenide (SnSe)

J. Hoeft, Z. Naturforsch. 21, 437 (1966)
S, B

Tin sulfide (SnS)

J. Hoeft, Z. Naturforsch. 20, 313 (1965)
 ν , B, S, 12 isotopes studied

Water (H_2O)

J. W. C. Johns, Humidity Moisture Papers, Int. Symp., Washington, D.C., 1,
417 (1963)
Spectra

M. Lichtenstein, V. E. Derr, and J. J. Gallagher, J. Mol. Spectroscopy 20,
391 (1966)
 ν, μ

C. B. Ludwig, C. C. Ferriso, W. Malkmus, and F. P. Boynton, J. Quant. Spectroscopy
Radiative Transfer 2, 697 (1965)
High temperature spectra of pure rotational band of H_2O

J. R. Rusk, J. Chem. Phys. 42, 493 (1965) Eng.
Line breadth study of the 1.64 mm absorption in water vapor

P. Thaddeus, L. C. Krisher, and J. H. N. Loubser, J. Chem. Phys. 40, 257 (1964)
eQq, c, H, D

Zenon oxytetrafluoride ($XeOF_4$)

J. Martins and E. B. Wilson, J. Chem. Phys. 41, 570 (1964)
B, S

ORGANIC MOLECULES

Acetaldehyde, trifluoro- (CF_3COH)

R. C. Woods, Diss. Harvard Univ. (1965)
H, D, A, B, C, V, S, μ , χ

Acetic acid, monofluoro- (CH_2FCOOH)

G. P. Srivastava, Physica 30, 1913 (1964)
A, B, C, χ

Acetic acid-trifluoroacetic acid ($\text{AcOH-CF}_3\text{CO}_2\text{H}$)

Y. Hanyu, Nippon Kagaku Zasshi 85, 5 (1964)
V, S

Y. Hanyu, J. Chem. Soc. Japan 85, 5 (1964)
Spectrum

C. C. Costain and G. P. Srivastava, J. Chem. Phys. 41, 1620 (1964)
S, H, D, B+C, bimolecules, χ

Acetic acid, trifluoro- -fluoroacetic acid ($\text{CF}_3\text{COOH-CH}_2\text{FCOOH}$)

C. C. Costain and G. P. Srivastava, J. Chem. Phys. 41, 1620 (1964)
S, H, D, B+C, bimolecules, χ

Acetic acid, trifluoro- -glacial acetic acid ($\text{CF}_3\text{COOH-CH}_3\text{COOH}$)

C. C. Costain and G. P. Srivastava, J. Chem. Phys. 41, 1620 (1964)
S, H, D, B+C, bimolecules, χ

Acetone (CH_3COCH_3)

R. Nelson and L. Pierce, J. Mol. Spectroscopy 18, 344 (1965)
S, V, Cl₂, 13, O₁₆, 18

R. Peter, Diss. Univ. Freiburg, Ger. (1965)
H, D, A, B, C, V, μ , χ

R. Peter and H. Dreizier, Z. Naturforsch 20, 301 (1965)
 μ , I, torsion splitting

Acetonitrile ($\text{C}_2\text{H}_3\text{N}$)

A. Bauer, A. Moises, and S. Maes, Compt. Rend., Ser. A, B-262 B(8), 558
(1966) Fr.
B, D_j, D_{jk}, eQq

P. A. Steiner, Diss. Duke Univ., Diss. Abstract 26, 65-7061 (1965)
H, D, B, D_j, μ

Acetonitrile, diazo- ($\text{N}_2:\text{CHCN}$)

C. C. Costain and J. Yarwood, J. Chem. Phys. 45, 1961 (1966)
S, μ

Acetonitrile, difluoro- (CHF_2CN)

B. E. Job, P. A. Curnuck, and J. Sheridan, Eighth Europ. Congr. Mol.
Spectroscopy, Copenhagen, Paper 166 (1965)

Acetonitrile, fluoro- (CH_2FCN)

B. E. Job, P. A. Curnuck, and J. Sheridan, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 166 (1965)
D, eQq

Acetylene-d (H-C≡C-H)

J. S. Muentner and V. W. Laurie, J. Am. Chem. Soc. 86, 3901 (1964)
B, D, μ , polarizability anisotropy

Acetylene, germyl- ($\text{GeH}_3\text{C:CH}$)

E. C. Thomas and V. W. Laurie, J. Chem. Phys. 44, 2602 (1966)
A, B, C, S, μ , isotopes (8 combinations)

Acetylene, methyl (CH_3CCH)

J. S. Muentner and V. W. Laurie, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper N-7 (1964)
H, D, μ

J. S. Muentner and V. W. Laurie, J. Chem. Phys. 45, 855 (1966)
 μ , deuterated effects on μ

Acetylene, silyl (SiH_3CCH)

M. C. L. Gerry and T. M. Sugden, Trans. Faraday Soc. 61, 2091 (1965)
A, B, C, α , D_J , ω , isotopes

Acetyl iodide (CH_3COI)

M. J. Maloney and L. C. Krisher, J. Chem. Phys. 45, 3277 (1966)
V, H, D, X

Acrolein (CH_2CHCOH)

E. A. Cherniak and C. C. Costain, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper N-4 (1964)

Acrolein, trans- ($\text{CH}_2:\text{CHCHO}$)

E. A. Cherniak and C. C. Costain, J. Chem. Phys. 45, 104 (1966)
S, eleven isotopic species

Alcohol, iso-propyl ($\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$)

A. N. Aleksandov and G. I. Tysovskii, Neftepererabofka i Neftekhim. 7, 37 (1966)
Small amounts of EtOH are determined in iso-PrOH

Alkali fluorides

S. E. Veazey, Univ. Microfilms (Ann Arbor, Mich.), Order No. 65-6668, 90 pp.,
Diss. Abstract 25(12), 7326 (1965)
Rotational spectroscopy of alkali fluorides

Alkali halides

J. R. Rusk, Univ. Microfilms (Ann Arbor, Mich.), Order No. 63-3605, 120 pp.,
Diss. Abstract 24, 2097 (1963)
Millimeter wave spectroscopy of the alkali halides in high temperature
molecular beams

Aminborane, trimethyl ($N(CH_3)_3BH_3$)

H. G. Schirdewahn and W. Maier, Tagungsprogr. Deutsche Phys. Ges., Regionalverband Baden-Wurtt. S. 10 (1964)

μ

H. G. Schirdewahn, Diss. Univ. Freiburg, Ger. (1965)

H, D, BlO, ll, B, Dj, S, v

Aniline ($C_6H_5N_2$)

D. G. Lister and J. K. Tyler, Chem. Communns. 6, 152 (1966)

S

Azulene ($C_{10}H_8$)

H. J. Tobler, H. Guenthard, and A. Bauder, J. Mol. Spectroscopy 18, 239 (1965)

A, B, C, μ , symmetry

Benzene (C_6H_6)

S. K. Garg, H. Kilp, and C. P. Smyth, J. Chem. Phys. 43, 2341 (1965)
Dielectric constant and loss of liquids at 2.1 mm

Benzene, bromo- (C_6H_5Br)

E. Rosenthal and B. P. Dailey, J. Chem. Phys. 43, 2093 (1965)
A, B, C, S, e ϵ q, D, Br^{79,81}, η

Benzene, iodo- (C_6H_5I)

K. Johansson, H. Oldeberg, and H. Selen, Arkiv Fysik 29, 531 (1965)
A, B, C, χ

Benzene, o-dichloro- ($C_6H_4Cl_2$)

K. E. Reinert, Exptl. Tech. Physik 13, 278 (1965) Ger.
S

Benzene, m-difluoro- ($C_6H_4F_2$)

A. Rachman, Spectrochim. Acta 22, 1551 (1966)
A, B, C, S

Benzene, o-fluorochloro- (C_6H_4ClF)

P. Kokeritz and H. Selen, Arkiv Fysik 30, 193 (1965)
A, B, C

Benzene, nitroso- (C_6H_5NO)

Y. Hanyu, C. O. Britt, and J. E. Boggs, J. Chem. Phys. 45, 4725 (1966)
 ω , V

Y. Hanyu and J. E. Boggs, J. Chem. Phys. 43, 3454 (1965)
A, B, C, S

Boron compound ($B_2H_2O_3$)

W. V. Brocks, C. C. Costain, and R. F. Porter, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 12 (1965)
H, D, O δ , S

Butadiene, 1, 1-difluoro- ($C_4H_4F_2$)

R. A. Beaudet, J. Chem. Phys. 42, 3758 (1965)
A, B, C, I, Int., Isomers, ν

Butadiene, 1, 1, 4, 4-tetrafluoro- ($C_4H_2F_4$)

R. A. Beaudet, J. Am. Chem. Soc. 87, 1390 (1965)
Stable conformation established, no pure rotational spectrum found

Butane, bicyclo- (C_4H_6)

M. D. Harmony and Kent Cox, J. Am. Chem. Soc. 88, 5049 (1966)
 μ , S

Butane, 2, 3-epoxy- ($CH_3CHOCHCH_3$)

M. Emtage, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper J-6 (1964)
A, B, C, V, ν , χ

Butane, trans 2, 3-epoxy- ($CH_3\overset{\text{O}}{\underset{\text{CHCHCH}_3}{\text{CH}}}CH_3$)

M. R. Emtage, Univ. Microfilms (Ann Arbor, Mich.), Order No. 65-8982,
89 pp., Diss. Abstract 26(10), 5740 (1966)
Microwave spectrum of

Carbon difluoride (CF_2)

F. X. Powell, J. Chem. Phys. 45, 1067 (1966)

Carbon dioxide (CO_2)

L. Frenkel and D. Woods, J. Chem. Phys. 44, 2219 (1966)
Microwave absorption in compressed CO_2

W. Ho, I. A. Kaufman, and P. Thaddeus, J. Chem. Phys. 45, 877 (1966)
 μ

R. Holmes, R. G. Jones, and R. Lawrence, J. Chem. Phys. 41, 2955 (1964)
Rotational relaxation

A. A. Maryott and S. J. Kryder, J. Chem. Phys. 41, 1580 (1964)
Collision-induced microwave absorption

Carbon monoxide (CO)

R. S. Freund and W. Klemperer, J. Chem. Phys. 43, 2422 (1965)
 μ

G. Jones and W. Gordy, Phys. Rev. 135, 295 (1964)
 D_0 , B_0

G. Jones, Univ. Microfilms (Ann Arbor, Mich.), Order No. 64-11, 680,
83 pp., Diss. Abstract 26(2), 1097 (1965)
Submillimeter wave spectra HBr, HCl, CO

Carbon tetrachloride (CCl_4)

S. K. Garg, H. Kilp, and C. P. Smyth, J. Chem. Phys. 43, 2341 (1965)
Dielectric constant and loss of liquids at 2.1 mm

Carbonyl fluoride (COF_2)

J. S. Rigden and R. H. Jackson, J. Chem. Phys. 45, 3646 (1966)
A, B, C, eQq, μ

Carbonyl sulfide (OCS)

A. Battaglia, A. DiGiacomo, and S. Santucci, Instituto Nationale di Fisica
Nucleare, Pisa INFN/FM-65/2 Nov. (1965)
 ν

A. Battaglia, A. DiGiacomo, and S. Santucci, Nuovo Cimento 43, 89 (1966)
Shift and broadening of microwave absorption lines due to double resonance
effects

A. P. Cox, G. W. Flynn, and E. B. Wilson, Jr., J. Chem. Phys. 42, 3094 (1965)
Intensity line shapes

H. A. Dijkerman, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 321
(1965)
 ν

F. Dorman and C. C. Lin, J. Mol. Spectroscopy 12, 119 (1964)
 $\text{Cl}^{2,13}, \text{O}^{16,18}, \text{S}^{32,34}, \alpha$

Carbonyl sulfide (OCS)

H. W. Harrington and R. H. Bauhaus, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper N-10 (1964)
Int.

P. K. Kodaba and S. K. Garg, J. Phys. Chem. 68, 1298 (1964)
Nonresonant absorption of compressed gas mixtures in Helium

Krishnaji, S. Chandra, and S. L. Srivastava, J. Chem. Phys. 41, 409 (1964)
 ν eQq

Krishnaji and S. L. Srivastava, J. Chem. Phys. 41, 2266 (1964)
Pressure broadening

Krishnaji and S. L. Srivastava, J. Chem. Phys. 42, 1546 (1965)
 ν

K. R. Lindfors and C. D. Cornwell, J. Chem. Phys. 42, 149 (1965)
Rate-of-growth technique for the measurement of molecular dipole moments
from microwave spectra at weak modulation fields.

J. S. Muirhead, U. S. Atomic Energy Commission UCRL-11229, 1 (1964)
Sensitivity of high temperature spectrometer determined

H. W. deWijn, Physica 31, 1215 (1965)
 ν

Cyanogen bromide (BrCN)

S. L. Srivastava and V. Prakash, J. Chem. Phys. 42, 3738 (1965)
 ν

H. W. deWijn, Physica 31, 1215 (1965)
 ν

Cyanogen chloride (ClCN)

W. J. Lafferty, D. R. Lide, and R. A. Toth, J. Chem. Phys. 43, 2063 (1965)
S, Cl35, 37, ν

H. W. deWijn, Physica 31, 1215 (1965)
 ν

Cyanogen fluoride (FCN)

W. J. Lafferty, Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 189 (1965)
 B, ν, α

Cyanogen radical (CN)

K. M. Evenson, J. L. Dunn, and H. P. Broida, Phys. Rev. 136, 1566 (1964)
Optical detection and identification of microwave transitions between
excited electronic states of CN

H. E. Radford, Phys. Rev. 136, 1571 (1964),
Hyperfine structure constants, eQq

Cyanogen sulfide ($S(CN)_2$)

W. Arnold, H. Dreizler, and H. D. Rudolph, Z. Naturforsch 19, 1428 (1964) Ger.
A, B, C, D_j, μ

L. Pierce, R. Nelson, and C. Thomas, J. Chem. Phys. 43, 3423 (1965)
S, μ , eQq, D_j, ω , Cl_{2,13}, Nl_{4,15}

Cyclobutane, bromo- (C_4H_7Br)

W. G. Rothschild, Chemistry Diss. Abstract, Order No. 62-1925
A, B, C, D, S, ν , Br_{79,81}, χ , η , four isotopic species report

Cyclobutane, chloro- ($CH_2CH_2CH_2CHCl$)

H. Kim, Univ. Microfilms (Ann Arbor, Mich.), Order No. 64-13, 035, Diss.
Abstract

Cyclobutane, methylene (C_5H_8)

L. H. Scharpen and V. W. Laurie, Symp. Mol. Struct. and Spectroscopy, Ohio,
Paper Y-8 (1964)
Inversion

Cyclobutanone (C_4H_6O)

L. S. Scharpen and V. W. Laurie, Symp. Mol. Struct. and Spectroscopy, Ohio,
Paper N-6 (1964)
 ν , μ

Cyclobutene ($CH:CHCH_2CH_2$)

H. Kim, Univ. Microfilms (Ann Arbor, Mich.), Order No. 64-13, 035, Diss.
Abstract

H. Kim and W. D. Gwinn, J. Chem. Phys. 42, 3728 (1965)
 μ , ν

Cyclobutyl chloride (C_4H_7Cl)

H. Kim, Diss. Univ. California, Berkeley, Diss. Abstract 25, 64-13, 035 (1964)
H, D, Cl_{2,13}, S, Int., A, B, C, eQq

H. Kim and W. D. Gwinn, Bull. Am. Phys. Soc. Ser. II 10, 491 (1965)
eQq

Cyclobutyl fluoride (C_4H_7F)

H. Kim, Diss. Univ. California, Berkeley, Diss. Abstract 25, 64-13, 035 (1965)
A, B, C, ν

H. Kim and W. D. Gwinn, Bull. Am. Phys. Soc. Ser. II 10, 491 (1965)
 μ

1, 3, 5-Cycloheptatriene (C_7H_8)

S. S. Butcher, J. Chem. Phys. 42, 1833 (1965)
A, B, C, μ

1, 3-Cyclohexadien (C_6H_8)

G. Luss and M. D. Harmony, J. Chem. Phys. 43, 3768L (1965)
A, B, C, D_j

Cyclohexane (C_6H_{12})

S. K. Garg, H. Kilp, and C. P. Smyth, J. Chem. Phys. 43, 2341 (1965)
Dielectric constant and loss of liquids at 2.1 mm

Cyclohexyl fluoride ($C_6H_{11}F$)

L. Pierce and J. F. Beecher, J. Am. Chem. Soc. 88, 5406 (1966)
A, B, C, S, μ

L. Pierce and R. Nelson, J. Am. Chem. Soc. 88, 216 (1966)
A, B, C, S, μ

Cyclopentadiene ($CH:CHCH:CHCH_2$)

L. H. Scharpen and V. W. Laurie, J. Chem. Phys. 43, 2765 (1965)

Cyclopentane, 1, 1-difluoro- ($CH_2CH_2CH_2CH_2CF_2$)

C. Tolman, Univ. Microfilms (Ann Arbor, Mich.), Order No. 64-13, 112,
Diss. Abstract
 α

Cyclopentane, germano- ($C_4H_{10}Ge$)

E. C. Thomas and V. W. Laurie, Symp. Mol. Struct. and Spectroscopy, Ohio,
Paper S-8 (1965)
 eQq , μ

Cyclopentanone ($COCH_2CH_2CH_2CH_2$)

H. Kim, Diss. Univ. California, Berkeley, Diss. Abstract 25, 64-13, 035 (1965)
H, D, Int., A, B, C, S, V, μ

Cyclopentene ($CH:CHCH_2CH_2CH_2$)

S. S. Butcher and C. C. Costain, J. Mol. Spectroscopy 15, 40 (1965)
Vibration-rotation interaction

S. I. Subbotin, V. I. Tyolin, D. I. Katayev, and V. M. Tatevskii, Optics
and Spectroscopy 19, 361 (1965)

D_j

Cyclopropyl bromide (C_3H_5Br)

F. M. Lam, Univ. Microfilms (Ann Arbor, Mich.), Order No. 65-11, 694, 49 pp.,
Diss. Abstract 26(4), 1938 (1965)
Microwave study of

Cyclopropyl chloride (C_3H_5Cl)

G. D. Jacobs, Chemistry Diss. Abstract, Order No. 62-1655

R. H. Schwendeman, G. D. Jacobs, and T. M. Krigas, J. Chem. Phys. 40, 1022 (1964)
A, B, C, S, eQq

Diazine, difluoro- (FN=NF)

R. L. Kuczowski, Diss. Harvard Univ., Diss. Abstract 25, 64-11, 561 (1964)
N^{14,15}, Int., A, B, C, S, eQq, μ

Diazonitrile (N_2CHCN)

J. Yarwood and C. C. Costain, Symp. Mol. Struct. and Spectroscopy, Ohio,
Paper Y-13 (1965)
A, B, C, S

Diethyl sulfide (Et_2S)

N. M. Pozdeev, L. I. Panikovskaya, R. S. Nasibullin, I. M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch. Neft. i Nefteprod.
Akad. Nauk. S.S.S.R., Bashkirsk. Filial 7, 237 (1964)
 ν

Dimethylamine ($(CH_3)_2NH$)

J. E. Wollrab, Univ. Microfilms (Ann Arbor, Mich.), Order No. 65-6361, 202 pp.,
Diss. Abstract 26(1), 123 (1965)

Dimethyl disulfide ($(CH_3)_2S_2$)

N. M. Pozdeev, L. I. Panikovskaya, R. S. Nasibullin, I. M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch. Neft. i Nefteprod.
Akad. Nauk. S.S.S.R., Bashkirsk. Filial 7, 237 (1964)
 ν

D. Sutter, H. Dreizler, and H. D. Rudolph, Z. Naturforsch 20, 1676 (1965)
S, μ , V, D

Dimethyl sulfide ($S(CH_3)_2$)

W. Arnold, H. Dreizler, and H. D. Rudolph, Z. Naturforsch 19, 1428 (1964)
S, μ

H. Dreizler and H. D. Rudolph, Z. Naturforsch 20, 749 (1965)
Analysis of centrifugal broadening of rotational spectra

N. M. Pozdeev and L. I. Panikovskaya, Khim. Seraorgan. Soedin., Soderzhashch.
Neft. i Nefteprod. Akad. Nauk. S.S.S.R., Bashkirsk. Filial 6, 233 (1964)
A, B, C, S, μ , eQq

N. M. Pozdeev, L. I. Panikovskaya, R. S. Nasibullin, I. M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch. Neft. i Nefteprod.
Akad. Nauk. S.S.S.R., Bashkirsk. Filial 7, 237 (1964)
A, B, C

Dimethyl sulfoxide ($(CH_3)_2SO$)

H. Dreizler and G. Dendl, Z. Naturforsch 19, 512 (1964)
A, B, C, S, μ , H, D

H. Dreizler and G. Dendl, Z. Naturforsch 20, 30 (1965)
D_j, D_{jk}

H. Dreizler and G. Dendl, Z. Naturforsch 20, 1431 (1965)

Dimethyl sulfoxide $(\text{CH}_3)_2\text{SO}$

H. Dreizler, G. Dendl, and W. Feder, Eighth Europ. Congr. Mol. Spectroscopy,
Copenhagen, Paper 210 (1965)

Disylanyl fluoride $(\text{SiH}_3-\text{SiH}_2\text{F})$

A. P. Cox and R. Varma, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper J-8
(1964)

A, B, C, S, V, μ

Ethane, 1-chloro-2-fluoro- ($\text{FH}_2\text{C}-\text{CH}_2^{37}\text{Cl}$)

I. A. Mukhtarov, Izv. Akad. Nauk Azerb. S.S.R., Ser. Fiz.-Tekhn. i Mat. Nauk 5, 37 (1964)
A, B, C, χ_a , χ_b , χ_c

Ethane, 1, 1-dichloro- (CH_3CHCl_2)

W. H. Flygare, J. Mol. Spectroscopy 14, 145 (1964)
A, B, C, S, eQq

Ethane, 1-fluoro-2-chloro- ($\text{CH}_2\text{FCH}_2\text{Cl}$)

I. A. Mukhtarov, Optics and Spectroscopy 19, 543 (1965)
A-C, ν , χ

Ethane, trifluoro- ($\text{F}_2\text{HC}-\text{CH}_2\text{F}$)

I. A. Mukhtarov, Optics and Spectroscopy 16, 494 (1964)
D, ν , Int., torsional vibration frequency

Ethane, 1,1,1-trifluoro- ($\text{F}_2\text{DCCD}_2\text{F}$)

I. A. Mukhtarov, Optika i Spektroskopiya 16, 360 (1964)
 ν

Ethane, 1,1,2-trifluoro- (CH_2FCHF_2)

I. A. Mukhtarov, Tr. Komis. po Spektroskopii, Akad. Nauk S.S.S.R. 3, 248 (1964)
Torsional satellites of rotational transitions

I. A. Mukhtarov, Optika i Spektroskopiya 20, 352 (1966)
A, B, C

I. A. Mukhtarov and R. I. Mukhtarov, Izv. Akad. Nauk Azerb. S.S.R., Ser. Fiz.-Tekhn. i Mat. Nauk 5, 167 (1965)
A, B, C, centrifugal perturbation

Ethane, 1,2,2-trifluoro- (CH_2FCHF_2)

I. A. Mukhtarov, Optics and Spectroscopy 16, 197 and 494 (1964)
D, A, B, C, μ

I. A. Mukhtarov and R. I. Mukhtarov, Optics and Spectroscopy 19, 546 (1965)
A, B, C, D_j

Ethanol, 2-fluoro- ($\text{CH}_2\text{FCH}_2\text{OH}$)

K. S. Buckton, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper Y-6 (1965)

Ethene, 1,1-difluoro- (CH_2CF_2)

J. C. Chauffouraux, Bull. Acad. Roy. Belg. 51, 47 (1965)
A, B, C, D_j, χ

Ethylacetylene ($\text{HCCCH}_2\text{CH}_3$)

B. E. Job, P. A. Curnuck, and J. Sheridan, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen, Paper 166 (1965)
 μ

Ethyl alcohol ($\text{CH}_3\text{CH}_2\text{OH}$)

A. N. Aleksandov and G. I. Tysovskii, Neftepererabofka i Neftekhim 7, 37 (1966)
Small amounts of EtOH are determined in iso-PrOH)

Ethyl alcohol (C_2H_5OH)

L. M. Imanov and C. O. Kadzhar, Optics and Spectroscopy 18, 194 and 508
(1965)

H, D, A, B, C, S, χ

L. M. Imanov, C. O. Kadzhar, and A. A. Abdurakhmanov, Tr. Komis. po
Spektroskopii, Akad. Nauk S.S.S.R. 3, 214 (1964).

A, B, C, μ , S, H, D

L. M. Imanov, C. O. Kadzhar, and I. D. Isaev, Optika i Spektroskopiya
18, 344 (1965)

A, B, C, I, v, S

L. M. Imanov, C. O. Kadzhar, and I. D. Isaev, Izv. Akad. Nauk Azerb. S.S.R.
Ser. Fiz.-Tekhn. i Mat. Nauk 2, 110 (1965)

v, A, B, C

L. M. Imanov, C. O. Kadzhar, and I. D. Isaev, Optika i Spektroskopiya 18,
904 (1965)

A, B, C, I, D, D_j , D_{jk}

L. M. Imanov, A. A. Abdurakhmanov, and R. A. Ragimova, Dokl. Akad. Nauk
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D_j , D_{jk} , D, A, B, C, I

L. M. Imanov, A. A. Abdurakhmanov, and R. A. Ragimova, Bull. Acad. Sci.
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H, D, v, A, B, C

L. M. Imanov, A. A. Abdurakhmanov, and R. A. Ragimova, Izv. Akad. Nauk
Azerb. S.S.R., Ser. Fiz.-Tekhn. i Mat. Nauk 3, 103 (1964)

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L. M. Imanov, A. A. Abdurakhmanov, and R. A. Ragimova, Optics and Spectroscopy
17, 162 (1964)

H, D, A, B, C

L. M. Imanov, A. A. Abdurakhmanov, and R. A. Ragimova, Optika i Spektroskopiya
17, 306 (1964)

A, B, C, H, D

J. Michielsen-Effinger, Bull. Classe. Sci. Acad. Roy. Belg. 50, 645 (1964) Fr.
V

J. Michielsen-Effinger, Ann. Soc. Sci. Bruxelles, Ser. I 78, 223 (1964)
D, S

J. Michielsen-Effinger, Ann. Soc. Sci. Bruxelles 79, 253 (1965)
H, D, O^{16,18}, A-C, S, V, χ

J. Michielsen-Effinger, Ann. Soc. Sci. Bruxelles, Ser. I 79, 253 (1966)
S, V, v, H, O, O^{16,18}

Ethylene carbonate

I. Wang, C. O. Britt, and J. E. Boggs, J. Am. Chem. Soc. 87, 4950 (1965)
Planarity of the ring atoms

Ethylene, nitro- (CH_2CHNO_2)

H. D. Hess, A. Bauder, and H. H. Gunthard, Symp. Mol. Struct. and Spectroscopy,
Paper N-1 (1964)
A, B, C, μ

Ethylene oxide ($\text{C}_2\text{H}_4\text{O}$)

T. Oka and D. A. Ramsey, Bull. Am. Phys. Soc. Ser. II 2, 489 (1964)
 ν

Ethylene, trifluoro- (C_2HF_3)

I. A. Mukhtarov, Optika i Spektroskopiya 16, 910 (1964)
Frequency of torsional vibration

I. A. Mukhtarov, Bull. Acad. Sci. Azerb. S.S.R., N-1, 71 (1965)
A, B, C, μ

I. A. Mukhtarov, Izv. Akad. Nauk Azerb. S.S.R., Ser. Fiz.-Tekhn. i Mat.
71 (1965)
A, B, C, μ , (the molecule is non planar)

Ethylenimine (NHCH_2CH_2)

W. M. Tolles and W. D. Gwinn, J. Chem. Phys. 42, 2253 (1965)
 eQq , lower limit to carrier for inversion

Ethyl halides

J. Lielmezs and J. P. Morgan, Nature 202, 1106 (1964)
Relation between internal rotational barrier and ionization energy of
substituted atoms.

Ethyne, 2-deutero-1-methoxy (DC:COM_e)

D. D. Engelsen, H. A. Dijkerman, and J. Kerssen, Rec. Trav. Chem. 84, 1357
(1965)
A, B, C, S, μ

Fluoracetylfluoride (CH_2FCOF)

E. Saegebarth, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper J-5 (1964)
A, B, C

Fluoroform (CHF_3)

C. C. Costain, Can. J. Phys. 43, 244 (1965)
Anomalous Stark effect on fluoroform in $V_6=1$ vibration state

P. K. Kadaba and S. K. Garg, J. Phys. Chem. 68, 1298 (1964)
Nonresonant absorption of compressed gas mixtures in Helium

S. Maes and G. Amat, Can. J. Phys. 43, 321 (1965)
Study of anomalies in rotation spectrum, H, D

Formaldazine ($\text{CH}_2=\text{NH}$)

J. F. Ogilivie, Chem. Communs. 15, 359 (1965)
S

Formaldehyde (CH_2O)

W. H. Flygare, J. Chem. Phys. 41, 206 (1964)
H, D, χ

W. H. Flygare, J. Chem. Phys. 42, 1563 (1965)
H, D, A, B, C

W. H. Flygare and J. T. Lowe, Proc. Natl. Acad. Sci. U.S. 53, 576 (1965)
Spin rotation interaction, Int.

W. H. Flygare and J. T. Lowe, J. Chem. Phys. 43, 3645 (1965)
eQq, c

W. H. Flygare and J. T. Lowe, J. Chem. Phys. 41, 2153 (1964)
D

J. T. Lowe and W. H. Flygare, Symp. Mol. Struct. and Spectroscopy, Ohio,
Paper Y-5 (1965)
C_{12,13}, O_{16,17}, eQq

T. Oka, K. Takagi, and Y. Morino, J. Mol. Spectroscopy 14, 27 (1964)
D, A, B, C, coriolis interaction discussed

M. G. K. Pillai, J. Annamalai Univ. Pt. B25, 126 (1964) Ind.
A, B, C, S, D, O_{16,18}

P. Thaddeus, J. H. N. Loubser, and L. C. Kirsher, J. Chem. Phys. 40, 257
(1964)
eQq, c, H, D

Formic acid (HCOOH)

J. Bellet, C. Samson, and R. Wertheimer, Compt. Rend., Ser. A, B262B, 1333
(1966) Fr.
A, B, C, D_j, D_{jk}

Formic acid (HCOOH)

H. Kim, Univ. Microfilms (Ann Arbor, Mich.), Order No. 64-13, 035, Diss.
Abstract

Furan, 2,5-di-hydro-

G. G. Engerholm, Univ. Microfilms (Ann Arbor, Mich.), Order No. 66-3580, 117 pp.,
Diss. Abstract 26(12), 7060 (1966)

Furan, tetrahydro- ($\text{OCH}_2\text{CH}_2\text{CH}_2\text{CH}_2$)

G. G. Engerholm, Univ. Microfilms (Ann Arbor, Mich.), Order No. 66-3580, 117 pp.,
Diss. Abstract 26(12), 7060 (1966)
Microwave spectrum of

G. G. Engerholm, D. O. Harris, and W. D. Gwinn, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper S-4 (1965)

V

Furfural ($\text{C}_4\text{H}_3\text{OCHO}$)

F. Moennig, H. Dreizler, and H. D. Rudolph, Z. Naturforsch 20, 1323 (1965) Ger.
 μ , ν , A, B, C

Heptaborane, 2,4-dicarba- ($\text{C}_2\text{B}_5\text{H}_7$)

R. A. Beaudet and R. L. Poynter, J. Am. Chem. Soc. 86, 1258 (1964)
S, isotopes

R. A. Beaudet and R. L. Poynter, J. Chem. Phys. 43, 2166 (1965)
A, B, C, S, μ

n-Heptane ($\text{CH}_3(\text{CH}_2)_5\text{CH}_3$)

S. K. Garg, C. P. Smyth, and H. Kilp, J. Chem. Phys. 43, 2341 (1965)
Dielectric constant and loss of liquids at 2.1 mm

Hexaborane, 2,3-dicarba-

R. L. Poynter and R. E. Beaudet, Symp. Mol. Struct. and Spectroscopy,
Ohio, Paper S-7 (1965)

Isocyanic acid (OCNH)

K. White and R. L. Cook, Bull. Am. Phys. Soc. Ser. II 10, 491 (1965)
 μ

Isoprene ($\text{CH}_2:\text{CHC}(\text{CH}_3):\text{CH}_2$)

D. R. Lide, Jr. and M. Jen, J. Chem. Phys. 40, 252 (1964)
S

Ketene (D_2C_2O)

W. H. Flygare and V. W. Weiss, J. Am. Chem. Soc. 87, 5317 (1965)
X field gradient, magnetic shielding

Ketene, ketene-d1, ketene-d2 (H_2C_2O)

V. W. Weiss and W. H. Flygare, J. Chem. Phys. 45, 3475 (1966)

Ketene, methyl ($CH_3CH:CO$)

B. Bak, J. J. Christiansen, K. Kunstmann, L. Nygaard, and J. Rastrup-
Andersen, J. Chem. Phys. 45, 883-7 (1966)
S, V, μ

Ketone, methyl vinyl (C_4H_6O)

P. D. Foster, V. M. Rao, R. F. Curl, J. Chem. Phys. 43, 1064 (1965)
V, μ

Methane, bromofluoro- (CH_2FBr)

P. A. Curnuck, Ph.D. Thesis Univ. Birmingham, Eng. (1965)
H, D, eQq

Methane, chlorodifluoro- (CHClF_2)

P. K. Kadaba and S. K. Garg, J. Phys. Chem. 68, 1298 (1964)
Nonresonant absorption of compressed gas mixtures in helium

Methane, chlorotrifluoro- (CClF_3)

P. K. Kadaba and S. K. Garg, J. Phys. Chem. 68, 1298 (1964)
Nonresonant absorption of compressed gas mixtures in Helium

Methane, dichlorofluoro- (CHFCl_2)

D. B. McLay, Can. J. Phys. 42, 720 (1964)
A, B, C, eQq, S

Methane, fluorobromo- (CH_2FBr)

P. H. Curnuck and J. Sheridan, Nature 202, 591 (1964)
A, B, C, S, γ , nuclear quadrupole coupling constants

Methane, iodofluoro- (CH_2FI)

P. A. Curnuck, Ph.D. Thesis, Univ. Birmingham, Eng. (1965)
eQq

Methane, trichlorofluoro- (CCl_3F)

T. L. Weatherly, Q. Williams, and A. A. Wolf, Bull. Am. Phys. Soc. Ser. II
10, 492 (1965)
eQq

A. A. Wolf, T. L. Weatherly, and Q. Williams, Bull. Am. Phys. Soc. Ser. II
10, 246 (1965)
v

Methane, trifluoronitro- (CF_3NO_2)

W. M. Tolles, E. Handelman, and W. D. Gwinn, J. Chem. Phys. 43, 3019 (1965)
 μ , V, A, B, C

Methane, trifluoronitroso- (CF_3NO)

J. E. Boggs, C. deWitt, and J. C. Davis, J. Phys. Chem. 68, 2383 (1964)

Methinophosphide (CH : P)

J. K. Tyler, J. Chem. Phys. 40, 1170 (1964)
S, μ

Methoxychloride (CH_3OCl)

J. S. Rigden and S. S. Butcher, J. Chem. Phys. 40, 2109 (1964)
H, D, Cl_{2,13}, A, B, C, S, eQq, V

Methoxyethylene (HC:COM_e)

D. den Engelsen, H. A. Dijkerman, and J. Kerssen, Rec. Trav. Chim. 84,
1357 (1965)
A, B, C, S, μ , H, D

Methylazide

W. M. Salathiel and R. F. Curl, Jr., J. Chem. Phys. 44, 1288 (1966)
 μ , V

W. Salathiel, R. F. Curl, and G. McClure, Symp. Mol. Struct. and Spectroscopy,
Ohio, Paper Y-7 (1965)
S, μ , V

Methyl bromide (CD_3Br 79, 81)

A. K. Garrison, J. W. Simmons, and C. Alexander, J. Chem. Phys. 45, 413 (1966)
 B_e , D_j , D_{jk}

K. R. Lindfors and C. D. Cornwell, J. Chem. Phys. 42, 149 (1965)
 μ , rate-of-growth technique for the measurement of molecular dipole
moments from microwave spectra at weak modulation fields.

R. H. Schwendeman and J. D. Kelly, J. Chem. Phys. 42, 1132 (1965)
 B , eQq , S, D, Br 79, 81, $C^{12,13}$

J. W. Simmons, A. K. Garrison, and C. Alexander, Bull. Am. Phys. Soc. Ser.
II 10, 492 (1965)
 D , B, D_j , eQq

Methyl chloride (CH_3Cl)

G. Birnbaum and A. A. Maryott, J. Chem. Phys. 41, 154 (1964)
Relaxation times

C. H. Burton, W. B. Lasich, J. H. Noon, and R. W. Parsons, Australian J.
Phys. 17, 175 (1964)
Collision broadening in the inversion spectrum

C. H. Burton, W. B. Lasich, J. H. Noon, and R. W. Parsons, Australian J.
Phys. 19, 283 (1966)
Pressure broadening effects in mixtures of CH_3Cl and nonpolar gases

H. A. Dijkerman, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen,
Paper 321 (1965)
 ν

A. K. Garrison, J. W. Simmons, and C. Alexander, J. Chem. Phys. 45, 413 (1966)
 B_e , D_j , D_{jk}

S. H. Noon, Bull. Am. Phys. Soc. Ser. II 9, 101 (1964)
 ν

J. A. Roberts and R. W. Parson, J. Mol. Spectroscopy, 20, 197 (1966)
Self and foreign gas broadening in rotation spectrum of

J. W. Simmons, A. K. Garrison, and C. Alexander, Bull. Am. Phys. Soc.
Ser. II 10, 492 (1965)
 D , B, D_j , eQq

R. H. Schwendeman and J. D. Kelly, J. Chem. Phys. 42, 1132 (1965)
 B , eQq , S, D, $C^{12,13}$, $C^{135,37}$

Methyl fluoride (CHF_3)

G. Birnbaum and A. A. Maryott, J. Chem. Phys. 41, 154 (1964)
Relaxation times

J. S. Muenster and V. W. Laurie, J. Chem. Phys. 45, 855 (1966)
 μ , deuterated isotope effects on μ

P. A. Steiner, Diss. Duke Univ., Diss. Abstract 26, 65-7061 (1965)
H, D, B, D_3 , μ

Methylgermane

J. S. Muenster and V. W. Laurie, J. Chem. Phys. 45, 855 (1966)
 μ , deuterated isotope effects on μ

Methyl hypochlorite (CH_3OCl)

J. S. Rigden and S. S. Butcher, J. Chem. Phys. 40, 2109 (1964)
S, eQq, V

Methyl iodide ($\text{CD}_3^{127}\text{I}$)

A. K. Garrison, J. W. Simmons, and C. Alexander, J. Chem. Phys. 45, 413
(1966)
 B_e , D_J , D_{jk}

J. W. Simmons, A. K. Garrison, and C. Alexander, Bull. Am. Phys. Soc.
Ser. II 10, 492 (1965)
D, B, D_J , eQq

N-Methyl methylenimine (CH_3NCH_2)

K.V.L.N. Sastry and R. F. Curl, J. Chem. Phys. 41, 77 (1964)
V, μ , χ

J. T. Yardley, J. Hinze, and R. F. Curl, J. Chem. Phys. 41, 2562 (1964)
Quadrupole structure observed

Methyl nitrate (CH_3ONO_2)

S. S. Butcher, Diss. Harvard Univ., Diss. Abstract 25, 860 (1964)
V

D. Stelman, Diss. Univ. California, Berkeley, Diss. Abstract 25, 64-9094
A, B, C, S, μ , eQq, V

Methyl selenide ($(\text{CH}_3)_2\text{Se}$)

J. F. Beecher, J. Mol. Spectroscopy 21, 414 (1966)
S, μ , V, isotopes

Methylsilane, chloro- ($\text{CH}_2\text{ClSiH}_3$)

G. D. Jacobs, Chemistry Diss. Abstract, Order No. 62-1655
I, S, V, χ , η

Methylsilyl, acetylene ($\text{CH}_3\text{CCSiH}_3$)

W. H. Kirchhoff and D. R. Lide, J. Chem. Phys. 43, 2203 (1965)
V

Oxaborolane, 1,3,2-di-

J. H. Hand and R. H. Schwendeman, J. Chem. Phys. 45, 3349 (1966)
S, μ , V, χ

1,2,5-Oxadiazole ($C_2H_2N_2O$)

E. Saegebarth and A. P. Cox, J. Chem. Phys. 43, 166 (1965)
S, μ , Cl^{2,13}, Nl^{4,15}, H, D, χ

1,3,4-Oxydiazole

B. Bak, J. T. Nielsen, F. Nielsen, L. Nygaard, J. Rastrup-Anderson, and
R. A. Steiner, J. Mol. Spectroscopy 19, 458 (1966)
A, B, C, D_j, D_{jk}, μ , I, S, inertial defect

Methylthiocyanate (CH_3SCN)

S. Nakagawa, T. Kojima, S. Takahashi, and C. C. Lin, J. Mol. Spectroscopy 14,
201 (1964)
A, B, C, μ , V, S

S. Nakagawa, S. Takahashi, T. Kojima, and C. C. Lin, J. Chem. Phys. 43, 3583
(1965)
A, B, C, μ , S, V

Methylthionylamine (CH_3NSO)

V. M. Rao, J. T. Yardley, and R. F. Curl, J. Chem. Phys. 42, 284 (1965)
V, μ

Methyl vinyl ether (CH_2CHOCH_3)

C. Patrick, L. P. Gold, and N. L. Owen, Eighth Europ. Congr. Mol. Spectros-
copy, Copenhagen, Paper 102 (1965)

Methyl vinyl ketone (C_4H_6O)

P. D. Foster, V. M. Rao, and R. F. Curl, J. Chem. Phys. 43, 1064 (1965)
V, μ

Perchloryl fluoride (ClO_3F)

D. R. Lide, J. Chem. Phys. 43, 3767 (1965)
S, A, B, C, I

Phenol ($\text{C}_6\text{H}_5\text{OH}$)

H. Forest, Univ. Microfilms (Ann Arbor, Mich.), Order No. 65-13, 943,
53 pp., Diss. Abstract 26(8), 4263 (1966)
S

H. Forest and B. P. Dailey, J. Chem. Phys. 45, 1736 (1966)
A, B, C, V, S, O^{16,18}, D

Phenyl, arsenic, tri- ($(\text{C}_6\text{H}_5)_3\text{As}$)

D. Knobloch and M. Stockhausen, Angew. Chem. 76, 186 (1964)
Relation times given

Phenyl methyl sulfide (MeSPh)

N. M. Pozdeev, L. I. Panikovskaya, R. S. Nasibullin, I. M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch Neft. i Nefteprod.
Akad. Nauk S.S.R., Bashkirsk. Filial 7, 237 (1964)

Phenyl, phosphine, tri- ($(\text{C}_6\text{H}_5)_3\text{P}$)

D. Knobloch and M. Stockhausen, Angew. Chem. 76, 186 (1964)
Relation times given

Piperidin ($\text{C}_5\text{H}_{11}\text{N}$)

J. E. Parkin and C. C. Costain, Symp. Mol. Struct. and Spectroscopy, Ohio,
Paper Y-14 (1965)
A, B, C, S

Pivalaldehyde ($(\text{CH}_3)_3\text{CCHO}$)

A. M. Ronn and R. C. Woods, J. Chem. Phys. 45, 3831 (1966)
V, μ

Propane (C_3H_8)

J. S. Muentter and V. W. Laurie, J. Chem. Phys. 45, 855 (1966)
 μ , deuterated isotope effects on μ

I. H. Scharpen and V. W. Laurie, Symp. Mol. Struct. and Spectroscopy,
Paper S-9 (1965)

Propane, 2-bromo- ($\text{C}_3\text{H}_7\text{Br}$)

H. Benz and A. Bauder, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen,
Paper 169 (1965)

R. H. Schwendeman and F. L. Tobaison, J. Chem. Phys. 43, 201 (1965)
S, Br^{79,81}, χ , η

Propane, 2-chloro- ($\text{C}_3\text{H}_7\text{Cl}$)

W. Good and A. Bauder, Eighth Europ. Congr. Mol. Spectroscopy, Copenhagen,
Paper 170 (1965)
H, D, Cl³⁵

Propane, 2-chloro- (C_3H_7Cl)

F. L. Tobiasor and R. H. Schwendeman, J. Chem. Phys. 40, 1014 (1964)
S, eQq, V, isotopes

Propane, epoxy (CH_3CHOCH_2)

A. S. Esbitt and E. B. Wilson, Rev. Sci. Instr. 34, 901 (1964)
Int., V

Propanethiol (C_3H_8S)

N. M. Pozdeev, L.I. Panikovskaya, R. S. Nasibullin, I. M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch. Neft. i Nefteprod.
Akad. Nauk. S.S.S.R., Bashkirsk. Filial 7, 237 (1964)

V

Propanethiol, methyl ($CH_3CHSCH_3CH_3$)

N. M. Pozdeev, L. I. Panikovskaya, R. S. Nasibullin, I.M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch. Neft. i Nefteprod.
Akad. Nauk. S.S.S.R., Bashkirsk. Filial 7, 237 (1964)

V

Propargyl fluoride ($CHCCH_2F$)

B. E. Job, P. A. Curnuck, and J. Sheridan, Eighth Europ. Congr. Mol. Spec-
troscopy, Copenhagen, Paper 166 (1965)
H, D, Cl_{2,13}, S, μ

Propene, 2-bromo- (C_3H_6Br)

H. P. Bena, A. Bauder, and H. Guenthard, J. Mol. Spectroscopy 21, 165 (1966)
V, Br_{79,81}, X

Propene, 1-chloro- (C_3H_6Cl)

R. A. Beaudet, J. Chem. Phys. 40, 2705 (1964)
A, B, C, S, eQq, V, μ

Propene, 2-chloro- (C_3H_6Cl)

M. L. Unland, V. Weiss, and W. H. Flygare, J. Chem. Phys. 42, 2138 (1965)
V, A, B, C, eQq, Cl_{35,37}, double resonance spectra

Propene, 3-fluoro- (C_3H_6F)

E. Hirota, J. Chem. Phys. 42, 2071 (1965)
A, B, C, S, μ , Int.

β -Propiolactone

D. W. Boone, Univ. Microfilms (Ann Arbor, Mich.), Order No. 65-10, 711, 76 pp.,
Diss. Abstract 26(4), 1930 (1965)
A microwave study of

D. W. Boone, C. O. Britt, J. E. Boggs, J. Chem. Phys. 43, 1190 (1965)
 μ , I, A, B, C

Propionaldehyde (CH_3CH_2CHO)

S. S. Butcher and E. B. Wilson, J. Chem. Phys. 40, 1671 (1964)
V, S

Propylene (C_3H_6)

E. Hirota and Y. Morino, J. Chem. Phys. 45, 2326 (1966)
S, μ

Y. Morino and E. Hirota, J. Chem. Soc. Japan 85, 535 (1964)
Analysis

Propylene, cis-1-chloro- ($CH_3CH:CHCl$)

R. A. Beaudet, J. Chem. Phys. 40, 2705 (1964)
V, eQq, μ , Cl35,37

Propylene oxide (OCH_2CHCH_3)

A. P. Cox, G. W. Flynn, and E. B. Wilson, J. Chem. Phys. 42, 3094 (1965)
Double resonance experiment

Pyrazole ($C_3H_4N_2$)

W.H. Kirchhoff, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper Y-9 (1965)
A, B, C, S

Pyridine

G. O. Sorensen, L. Nygaard, L. Mahler, Eighth Europ. Congr. Mol. Spec-
troscopy, Copenhagen, Paper 362 (1965)

Silane, methyl- (CH_3SiH_3)

J. S. Muenter and V. W. Laurie, J. Chem. Phys. 45, 855 (1966)
 μ

Silylgermane (SiH_3GeH_3)

R. Varma and A. P. Cox, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper J-7
(1964)
Ge^{70,72,74}, B, S, μ

Silylisocyanate (SiH_3NCO)

M. C. L. Gerry, T. M. Sugden, and J. C. Thompson, Eighth Europ. Congr. Mol.
Spectroscopy, Copenhagen, Paper 259
 D_{jk}

Thiacyclohexane ($C_6H_{11}NS$)

N. M. Pozdeev, L. I. Panikovskaya, R. S. Nasibullin, I. M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch Neft. i Nefteprod.
Akad. Nauk. S.S.S.R., Bashkirsk. Filial 7, 237 (1964)

v

1,3,4-Thiadiazoles

B. Bak, L. Nygaard, E. J. Pederson, and J. Rastrup-Anderson, J. Mol. Spectroscopy 19, 283 (1966)

Thiocyanic acid, iso-

J. S. Christiansen, R. L. Cook, and M. Winnewisser, Bull. Am. Phys. Soc.
Ser. II 10, 491 (1965)

D_j

Thiocyanic acid, methyl ester- (CH_3SCN)

S. Nakagawa, T. Kojima, S. Takahashi, and C. C. Lin, J. Mol. Spectroscopy
14, 201 (1964)

A, B, C, μ, S, V

Thiophane (SCH:CHCH:CH)

N. M. Pozdeev and K. K. Kostein, Tr. Komis. po Spektroskopii. Akad. Nauk.
S.S.S.R. 3, 231 (1964)

A, B, C, μ

N. M. Pozdeev, L. I. Panikovskaya, R. S. Nasibullin, I. M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch Neft. i Nefteprod.
Akad. Nauk. S.S.S.R., Bashkirsk. Filial 7, 237 (1964)

v

Thiophene (SCH:CHCH:CH)

N. M. Pozdeev, L.I. Panikovskaya, R. S. Nasibullin, I. M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch. Neft. i Nefteprod.
Akad. Nauk. S.S.S.R., Bashkirsk. Filial 7, 237 (1964)

v

Thiophene-2-carboxaldehyde

F. Moennig, H. Dreizler, and H. D. Rudolph, Z. Naturforsch 20, 1323 (1965)

μ, ν, A, B, C

Thiophene, 3-methyl- (C_4H_6S)

N. M. Pozdeev, L. I. Panikovskaya, R. S. Nasibullin, I. M. Evdokimov, and
L. A. Tikhomirov, Khim. Seraorgan. Soedin., Soderzhashch. Neft. i Nefteprod.
Akad. Nauk. S.S.S.R., Bashkirsk. Filial 7, 237 (1964)

v

Toluene, p-fluoro- ($CH_3C_6H_4F$)

H. D. Rudolph and H. Seiler, Z. Naturforsch 20, 1682 (1965)

V, μ, A, B, C

Trimethylamine ($(CH_3)_3N$)

J. E. Wollrab, U. S. Govt. Research and Development Rept. 40, 42 (1965)

S, D

Trimethylene sulfide (C_3H_6S)

D. O. Harris, H. W. Harrington, A. C. Luntz, and W. D. Gwinn, J. Chem. Phys. 44, 3467 (1966)
 α , potential function for ring-puckering vibration

D. O. Harris, H. W. Harrington, and W. D. Gwinn, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper S-5 (1965)
V

H. W. Harrington, Symp. Mol. Struct. and Spectroscopy, Ohio, Paper S-6 (1965)

M. S. White and E. L. Beeson, J. Chem. Phys. 43, 1839 (1965)
 μ , A, B, C, v, Int.

Trioxane ($C_3H_6O_3$)

J. Bellet, J. Lemaire, and C. Samson, Compt. Rend., Ser. A, B262B(13), 885
(1966) Fr.
 D_j , D_{jk} , B

s-Trioxane ($OCH_2OCH_2OCH_2$)

T. Oka, K. Tsuchiya, S. Iwata, and Y. Morino, Bull. Chem. Soc. Japan 37, 4
(1964)
S, μ , A, B, C, v

Triphenylamine ($(C_6H_5)_3N$)

D. Knobloch and M. Stockhausen, Angew. Chem. 76, 186 (1964)
Relaxation times given

Vinyl bormide ($\text{H}_2\text{C:CHBr}$)

G. A. Savariraj, Ann. Soc. Sci. Bruxelles Ser. I 78, 200 (1964)
Spectra

G. A. Savariraj, Ann. Soc. Sci. Bruxelles Ser. I 80, 88 (1966)
A, D_j, isotopes

G. A. Savariraj, Ann. Soc. Sci. Bruxelles Ser. I 80, 120 (1966)
Three level double resonance experiments

R. Windmolders, Bull. Classe. Sci., Acad. Roy. Belg. 50, 90 (1964)
A, B, C, H, D

Vinyl chloride ($\text{H}_2\text{C:CHCl}$)

G. A. Savariraj, Ann. Soc. Sci. Bruxelles Ser. I 80, 88 (1966)
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